WHAT IS CLAIMED IS:

1. A protection relay for determining whether or not a faultal point of a power system exists in a predetermined range, comprising:

filter means for inputting sampling data of a voltage and a current in the power system to a digital filter having a predetermined transfer function and outputting a first voltage data and a first current data, and a second voltage data and a second current data normal to the first voltage data and the first current data, respectively;

calculation means for calculating a predetermined measurement value based on the first voltage data, the first current data, the second voltage data and the second current data at a first time and the first voltage data, the first current data, the second voltage data and the second current data at a second time different from the first time; and

operation decision means for performing an operation decision based on the predetermined measurement value obtained by the calculation means.

2. The protection relay according to claim 1, wherein the predetermined measurement value obtained by the calculation means contains at least one of a reactance value and an Ohm value.

3. The protection relay according to claim 2, wherein the filter means comprises:

first filter means for inputting the sampling data v_m and i_m at the first time T_m to a digital filter having transfer function $f(Z)\cdot(1+k\cdot Z^{-1}+Z^{-2})$ (Z indicates a Z conversion operator) so as to output voltage data v_{sm} and current data i_{sm}; and second filter means for inputting the sampling data v_m, i_m at the first time T_m is inputted to a digital filter having transmission $f(Z)\cdot(1-Z^{-2})$ (Z indicates a Z conversion operator) so as to output voltage data v_{jm} and current data i_{jm} normal to the voltage data v_{sm} and the current data i_{sm},

the calculation means calculates a reactance value X_m based on:

$$X_m = \frac{-v_{sm}\cdot i_{sm-p} + i_{sm}\cdot v_{sm-p}}{-i_{jm}\cdot i_{sm-p} + i_{jm-p}\cdot i_{sm}}$$

using the first voltage data v_{sm}, the first current data i_{sm}, the second voltage data v_{jm} and the second current data i_{jm} at the first time t_m and the first voltage data v_{sm-p}, the first current data i_{sm-p}, the second voltage data v_{jm-p} and the second current data i_{jm-p} at the second time t_{m-p}, and

the operation decision means has an operation decision section which decides the operation based on the reactance value X_m.

4. The protection relay according to claim 3, wherein the operation decision means decides the operation based on a decision expression of $X_m \leq X_s$

based on the reactance value X_m and a setting value X_s.

5. The protection relay according to claim 3, wherein the calculation means calculates an Ohm value R_m based on:

using the first voltage data v_{sm}, the first current data i_{sm}, the second voltage data v_{jm} and the second current data i_{jm} at the first time t_m and the first voltage data v_{sm-p}, the first current data i_{sm-p}, the second voltage data v_{jm-p} and the second current data i_{jm-p} at the second time t_{m-p}, the Ohm value R_m is calculated based on

$$R_m = \frac{-i_{jm} \cdot v_{sm-p} + v_{sm} \cdot i_{jm-p}}{-i_{jm} \cdot i_{sm-p} + i_{jm-p} \cdot i_{sm}}, \text{ and}$$

the operation decision means decides the operation from the reactance value X_m from the calculation means according to a decision expression:

$$(R_m - R_0) \cdot (R_m - R_F) + (X_m - X_0) \cdot (X_m - X_F) \leqq 0$$

where; R_0 (Ohm component) represents an offset mho near side setting value;

X_0 (reactance component) represents an offset mho near side setting value;

R_F (Ohm component) represents an offset mho far side setting value; and

X_F (reactance component) represents an offset mho far side setting value.

6. The protection relay according to claim 2, wherein

the filter means comprises: first filter means for inputting the sampling data v_m and i_m at the first time T_m to a digital filter having transfer function $f(Z) \cdot (1+k \cdot Z^{-1}+Z^{-2})$ (Z indicates a Z conversion operator) so as to output voltage data v_{sm} and current data i_{sm}; and second filter means for inputting the sampling data v_m and i_m at the first time T_m to a digital filter having transmission $f(Z) \cdot (1-Z^{-2})$ (Z indicates a Z conversion operator) so as to output voltage data v_{jm} and current data i_{jm} normal to the voltage data v_{sm} and the current data i_{sm}, and

the calculation means calculates an Ohm value R_m using the first and second voltage data v_{sm}, v_{jm}, v_{sm-p} and v_{jm-p} and the first and second current data i_{sm}, i_{jm}, i_{sm-p} and i_{jm-p} at the first and second times T_m and T_{m-p}, which are obtained by the first filter means and second filter means, and

the operation decision means decides the operation based on the Ohm value R_m from the calculation means.

7. A protection relay for determining whether or not a faultal point of a power system exists in a predetermined range, comprising:

filter means in which sampling data of voltage and current in the power system is inputted to a predetermined transfer function so as to output first voltage data and first current data and second voltage data and second current data normal to the first voltage data

and the first current data, respectively;

polarized voltage value calculation means for inputting the first and second voltage data and the first and second current data so as to calculate a third voltage normal to the first voltage; and

operation decision means for performing an operation decision based on the third voltage.

8. The protection relay according to claim 7, wherein

the polarized voltage value calculation means calculates a third voltage v_{pjm} based on the first voltage data v_{sm}, the first current data i_{sm}, the second voltage data v_{jm}, and the second current data i_{jm} and

the operation decision means decides the operation based on:

$$v_{pjm-p}\cdot\{(R_s\cdot i_{sm}+X_s\cdot i_{jm})-v_{sm}\}$$
$$-v_{pjm}\cdot\{(R_s\cdot i_{sm-p}+X_s\cdot i_{jm-p})-v_{sm-p}\}>K_2$$

using the third voltage v_{pjm}, the first voltage v_{sm}, the first current data i_{sm}, the second voltage data v_{jm}, the second current data i_{jm} at the first time t_m and the first voltage data v_{jm-p}, the first current data i_{jm-p} at the second time t_{m-p} and a setting value (R_s, X_s).

9. The protection relay according to claim 7, wherein the polarized voltage value calculation means calculates a voltage before predetermined cycles of

a voltage normal to the first voltage as the third voltage.

10. A protection relay for determining whether or not a faultal point of power system exists in a predetermined range, comprising:

first filter means for inputting sampling data v_m and i_m of voltage v and current i in the power system to a digital filter having transfer function $f(Z)\cdot(1+k\cdot Z^{-1}+Z^{-2})$ (Z indicates a Z conversion operator) so as to output voltage data v_{sm} and current data i_{sm};

second filter means in which the sampling data v_m, i_m are inputted to a digital filter having transfer function $f(Z)\cdot(1-Z^{-2})$ (Z indicates a Z conversion operator) so as to output voltage data v_{jm} and current data i_{jm} normal to the voltage data v_{sm} and current data i_{sm};

charging current compensation calculation means for calculating quantity of electricity defined in $i_{sm}-C\cdot v_{jm}$ by the current data i_{sm}, the voltage data v_{jm}, and a setting value C_s at time t_m;

transmission and reception means for transmitting output of the charging current compensation calculation means to an opposite terminal and when quantity of electricity at the opposite terminal is assumed to be B, receiving quantity of electricity defined by $(i_{sm}-C\cdot v_{jm})B$ at the opposite terminal; and

operation decision means for performing an operation decision based on outputs from the charging current compensation calculation means and the transmission/reception means according to the following expression:

$$\| (i_{sm}-Cs \cdot v_{jm})+(i_{sm}-Cs \cdot v_{jm})B \| \geqq ka \cdot \{ \| i_{sm}-Cs \cdot v_{jm} \| + \| (i_{sm}-Cs \cdot v_{jm})B \| \}+kb$$

where, $\|am\|$ represents a quantity parallel to amplitude of AC quantity of electricity "a" at time t_m;

ka represents a proportion restricting coefficient; and

kb represents minimum sensitivity current.

11. The protection relay according to any one of claims 1 to 9, wherein the filter means comprises: first filter means for inputting the sampling data to a digital filter having the first transfer function $f(Z) \cdot (1+k \cdot Z^{-1}+Z^{-2})$ (Z indicates a Z conversion operator) so as to output the first voltage data and current data; and second filter means for inputting the sampling data to a digital filter having the second transfer function $f(Z) \cdot (1-Z^{-2})$ (Z indicates a Z conversion operator) so as to output the second voltage data and the second current data.